

# Highlights

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## Washington SCIENCE TRENDS

INDUSTRY AND UTILITY spokesmen are showing interest in expansion of the civilian nuclear power program as proposed by the staff of the Joint Committee on Atomic Energy. Early returns from a committee questionnaire-survey indicate general approval of the aims of the program despite differences over details of its implementation.

The proposal, to be aired in a series of committee "seminars" in the coming months, calls for an expanded and modified power reactor demonstration program of privately owned "second generation" nuclear plants. At the same time the Government would contract with private industry and non-federal power organizations for advanced experimental prototype plants.

Here is a summary of the U.S. progress in civilian reactors: One prototype in operation, four under construction, ten planned. Seven civilian power reactor experiments in operation, two under construction and two planned. An additional 35 research and training reactors are in operation, 31 under construction and 20 planned. The Joint Committee staff believes more must be done to bridge the gap between high-cost first generation plants and economically competitive nuclear power.

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NATIONAL SPACE COUNCIL meets at the White House this week but may not reach a decision on the dispute between the Army and the National Aeronautics and Space Administration (NASA) over facilities and staff at the Army's Huntsville, Ala. missile laboratories and the Jet Propulsion Laboratory of California. Army Secretary Wilber Brucker may need more time to prepare his "brief" which is expected to propose that NASA have the authority to assign civilian space projects to Huntsville and JPL without actually taking control of laboratories and scientists at either installation. Brucker promises that the Army will handle any such assignment with dispatch -- particularly since the Huntsville role in the Jupiter missile program is being "phased out" as Chrysler Corp. takes over production problems.

Military implications of "civilian" space projects have been generally overlooked in the current debate. But Army is now talking freely of missiles to intercept unfriendly satellites and of the IPBM -- the Interplanetary Ballistic Missile.

Defense goals of two recent space projects have been soft-pedalled. The Army Beacon balloon satellite would have provided information on air density and geodetic measurements important for ballistic missiles. The Air Force Thor-Able may soon be adapted for a role in the "Sentry" military reconnaissance satellite program.

SATELLITE RESEARCH FINDINGS continue to surprise and pique the curiosity of space scientists. Dr. Ernst Stuhlinger of the Army Ballistic Missile Agency at Huntsville, Ala. points to these tentative conclusions, based on data still being analyzed:

\* Micrometeorite detectors aboard Explorer I "substantiated our belief that these small particles offer no hazard..."

\* Temperature within a space vehicle can "easily" be controlled within the range desired for human existence. Average temperature in the Explorers has been a "comfortable" 20 degrees. This has been accomplished through the choice of exterior materials and by the selection of launching time in regard to the sunlight shadow ratio to which the satellite is subjected.

\* Density of the atmosphere at 200 to 300 kilometers is about 40 percent higher than was anticipated.

RADIATION FINDINGS are still incomplete and may be altered by analysis of the Pioneer space probe data. However, Explorer IV, launched July 26, indicated that the intensity of radiation mounts extremely fast above 600 miles and that at the most distant point of the orbit -- 1300 miles -- radiation "was 10,000 times greater than when it started to enter the high radiation belt."

Here is Dr. Stuhlinger's theory on the formation of the radiation belt:

"Electrons and/or protons originating as products of cosmic radiation in high altitudes are forced into a spiral course by the earth's magnetic field. The spirals follow the lines of the earth's magnetic field. When approaching the earth's surface in the polar region the turns of the spirals are compressed due to the concentration of the magnetic field and finally each particle is forced into a spiral in the opposite direction. At the other pole the compression and turn of the spiral course repeats itself..."

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APPLIED RESEARCH AND DEVELOPMENT in electronics represented a \$5.5 billion expenditure in 1956 -- and nearly half, or \$3.1 billion, was financed by the Federal Government. That is the major finding of the first comprehensive study ever conducted of industrial R & D in the Electronics field. The total of U.S. funds made available for such purposes was up considerably over 1953 -- approximately 140 percent.

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POLIO VACCINE STOCKS continue to mount despite the urging of the Public Health Service. Over 40 million Americans in the susceptible age group under 40 have had no vaccine. Less than half of the nation's pre-school population have been fully vaccinated. PHS emphasizes that it has never traced a polio case to any lot of vaccine administered since the troubled days of May, 1955. Despite early fears that vaccinations in epidemic areas might "trigger" new cases the PHS says it has found not a single instance of such provocation. Yet more than 16 million doses remain unused on manufacturer's shelves. The total would be far higher but for the dumping of outdated stocks. PHS is leaning toward support of proposals that persons who have had a full course of three injections should receive a fourth booster.

ARMY RESEARCH AND DEVELOPMENT NEEDS as viewed by R&D Chief Lt. Gen. Arthur G. Trudeau emphasizes new techniques planned for modern warfare. Here is a checklist of current and projected projects:

\* Psychological tests which will enable the Army "to identify in advance the kind of man, the kind of soldier who can, and will, fight when he is put into action."

\* Medical research, particularly directed toward improving the care and treatment of patients on the battlefield, including atomic warfare casualties.

\* Polar research aimed at discovering new scientific facts and new means of providing facilities and other logistical support for military forces in polar regions.

\* Nuclear reactor research aimed at development of a truck-mounted power plant that can be towed over any terrain that can be traversed by a normal truck-tractor combination. Particular emphasis is being placed on "portable" reactors for arctic and desert operations.

\* Aircraft for combat surveillance capable of vertical or short take off and designed to fly "low" (10 feet perhaps) and "slow" (from 50 to 100 mph) carrying visual, photographic, infra-red and radar devices.

\* Communication equipment possessing self-contained cryptographic facilities and capable of handling an increased volume of messages on the battlefield.

Army is working to persuade the Pentagon to lift its restriction on load-carrying capacity of aircraft. It also wants new approaches to blind aircraft landing, takeoff and navigation and is developing an electronic system which will display to a pilot local terrain and obstacles.

MAN-PORTABLE GUIDED MISSILE is viewed by the Army as another "urgent" need. Maj. Gen. J. B. Medaris says the aim is to provide the infantryman "with a light, accurate, lethal weapon to serve a variety of purposes. It must be small enough for him to handle, light enough to be carried under the hardships imposed by combat, instantly responsive, simple to operate and sufficiently rugged to require little or no maintenance. It should defend him against armor, personnel or air attack, or help him to knock out fortified positions."

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TANTALUM INDUSTRY reported by Commerce Department to have excess production capacity over demand. Two years ago there was but one producer with a single plant. Today with government encouragement, there are seven producers with 10 or 11 plants. The metal is being used for defense work in the production of capacitors. Commerce officials expect increased demand as a result of expanded missile-electronic orders and use of the metal in high-temperature alloys.

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PUBLIC HEALTH SERVICE scientists credit a new drug with "impressive" blood-pressure lowering effects. The drug, known as JB 516, has been synthesized by the Lakeside Laboratories, Milwaukee. Studies carried out in 21 patients point the way to expanded clinical tests. The drug is said to be the most potent of the monamine oxidase (MAO) inhibitors yet studied, without harmful side effects.



THE CHECKLIST

- ( ) Electronics research and development effort surveyed in a report prepared for the National Science Foundation. 4 pages, free. (Write Office of Information, Electronic Industries Association, 1721 De Sales Street, N.W., Washington 6, D.C.)
- ( ) Capacitance measurements for electronic research may be aided by new comparison apparatus and standards designed to improve both the sensitivity and precision of measurements. Free. (Write National Bureau of Standards, Office of Technical Information, Washington 25, D.C.)
- ( ) Satellite observations are made possible on a "do-it-yourself" basis in a simplified handbook enabling the reader to calculate the orbit plane and the time and longitude a satellite will cross his latitude. \$1. (Write Publications Office, National Academy of Sciences, Washington 25, D.C.)
- ( ) Insecticides for protection of stored corn evaluated in a series of government tests covering lindane, malathion, methoxychlor, synergized pyrethum and ryania. Free. (Write Office of Information, U.S. Department of Agriculture, Washington 25, D.C. for Marketing Research Report No. 272)
- ( ) Polio Vaccine situation discussed in a report by Surgeon General Leroy S. Burney, U.S. Public Health Service. Free. (Write Information Office, U.S. Public Health Service, Washington 25, D.C.)
- ( ) The Vitron, a new concept of the atomic structure of matter in the glassy state may help to reconcile current hypotheses on glassy and crystalline structures. Free. (Write National Bureau of Standards, Office of Technical Information, Washington 25, D.C.)
- ( ) Tropospheric scatter communications designed for advanced Arctic bases has been placed into operation by Air Research and Development Command. (Write Office of Information Services, HQ, ARDC, Andrews Air Force Base, Washington 25, D.C. for Release 154-58)
- ( ) National Aeronautics and Space Administration, will no longer issue its publication, Research Abstracts. It will be replaced by Publication Announcements, to be issued every 2-4 weeks and to be available without charge upon request. The Announcements will list documents that are newly available from NASA and the security-classification actions that affect documents controlled by NASA and its predecessor, the National Advisory Committee on Aeronautics (NACA) as well as British and NATO republished reports on Aeronautics. (Individuals and organizations not now on the NACA-NASA mailing list may write Division of Research Information, NASA, 1520 H Street, N.W., Washington 25, D.C.)
- ( ) Space Medicine, a bibliography prepared by the U.S. Public Health Service, carries almost 400 references arranged in broad subject classes. 49 pages. Free. (Write Public Inquiries Branch, Public Health Service, Washington 25, D. C. for PHS Publication No. 617)

